AUTOMOTIVE AND GENERAL MECHANICS

EDUCATIONAL SPACES

Printing Instructions

1. Print the Table of Contents section to obtain an overview of the total document.
2. Print each document section that you are interested in.
3. For a *complete* document, please *print all* sections.

AUTOMOTIVE AND GENERAL MECHANICS

GENERAL PROGRAM GOALS AND OBJECTIVES

- ☐ Automotive and General Mechanics is a program designed to prepare students with skills that include servicing and maintenance of all types of automobiles. Instruction includes the diagnosis of malfunctions in and repair of engines; fuel, electrical, cooling, and brake systems; and drive train and suspension systems. Also, instruction is given in the adjustment and repair of individual components and systems such as radiators, transmissions, and carburetors. The program also includes training in applied communications, and employability skills including leadership, human relations and safe efficient work practices. Instruction at the secondary level requires a three year sequence of instruction with at least one multiple period block of instruction. All Automotive Technology programs must have the National Automotive Technicians Education Foundation (NATEF) Certification and all instructors must be Automotive Service Excellence (ASE) certified.

PROGRAM ACTIVITIES

- ☐ Lab Activities
- ☐ Lectures
- ☐ Demonstrations
- ☐ Simulations
- ☐ Storing

- ☐ Computer work
- ☐ Inventory
- ☐ Use of Tools and Safety Equipment
- ☐ Safety Simulations
- ☐ Hoisting
- ☐ Diagnostics
- ☐ Machining
- ☐ Welding
- ☐ Cutting
- ☐ Alignment
- ☐ Wheel Balancing
- ☐ Venting
- ☐ Cleaning/Washing
- ☐ Steam cleaning/Degreasing
- ☐ Team Teaching

AREAS

DESCRIPTION	EST. STAFF	EST. STUDENTS	SQ. FT. TOTAL
Classroom(s)	1-2	15-20	900
Combo Room	1-2	15-20	2000
Lab	1-2	15-30	15,000-18,000
Info Systems	1-2	2-5	600
Office(s)	1-2		150
Tool Room/Parts	1-2	2-4	1200-2400
Locker/Clean up Restrooms		25-30	1000
Mechanical Equip			400-500
Hazardous Waste			300
Outside Storage			6000-8000
Custodial Closet			

INTERNAL/EXTERNAL RELATIONSHIPS - WHAT SHOULD BE NEAR THIS AREA

- ☐ Offices and the lab should be close to each other.
- ☐ The lab, tool room and classroom all need to be adjacent.
- ☐ The information system/media center should be close but separate from the lab.
- ☐ Outside storage should be near the lab.
- ☐ The tool room needs to be close to the lab and classroom.

INTERNAL/EXTERNAL RELATIONSHIPS - WHAT SHOULD **NOT** BE NEAR THIS AREA

- ☐ Because of noise and fumes, the lab should be far from core classes and the media center.
- ☐ The hazardous materials should be stored away from welding.

UTILITIES

Plumbing:

- ☐ A hose bib is needed per two stalls and outside of each overhead door.
- ☐ A floor drain is needed in each stall tied into a recovery system as per guidelines.
- ☐ Grease traps are needed in all drains.
- ☐ Compressed air will need to be installed at each stall.
- ☐ Emergency wash stations and eye wash should be in each lab.
- ☐ Hot water and floor drains are needed in the wash area. If steam cleaning is used, ensure EPA compliance.
- ☐ Deep sinks are needed at the wash area.
- ☐ Gang sinks should be considered in the lab area (some deep).
- ☐ Water needs to be plumbed to the dynamometer.
- ☐ A floor sink should be included in the custodial closet.
- ☐ A sprinkler system should be considered.
- ☐ Plumbing should be positioned or dampened to minimize noise.
- ☐ A drinking fountain should be installed near the classroom area.

HVAC

- ☐ An integrated automobile exhaust system is needed.

- ☐ Extra exhaust should be considered for:

  Machine Room

  Welding

  Hazardous Storage Area

  Battery Charging Area

  Steam Cleaning Area

- ☐ The heating, ventilation, and air-conditioning system needs to be of sufficient size to keep each instructional space at a comfortable temperature.
- ☐ The system needs to have a fresh air exchange system to keep high air quality in each instructional space.
- ☐ The general classroom supply and exhaust ducts need to be positioned to minimize any draftiness in the room.
- ☐ The HVAC controls need to be designed to allow individuals the ability to modify the classroom temperature for the instructional requirements of the classroom activities.
- ☐ The controls need to be positioned so that the room temperature is not “misread” (e.g., not too close to a door, window, or vent).

Electrical:

- ☐ Electrical supply is needed for overhead doors.
- ☐ Electrical duplex and four-plex outlets are needed at each stall on all sides.
- ☐ A duplex outlet should be considered at the hoist.
- ☐ Electrical ceiling drops should be provided if possible.

- ☐ 220 volt outlets should be provided at the machine room, welding area, steam clean area and at cabinets. The 220 volt outlet should also be placed at various locations around the lab, where appropriate. (Consider three-phase with 440 volt.)
- ☐ Oversizing electrical service should be considered to handle future growth.
- ☐ Electrical supply is needed in the tool room.
- ☐ Demonstration tables should have electrical supply.
- ☐ Electrical supply outlets need to be sufficient to meet the electrical equipment needs of the modern classroom.
- ☐ Electrical supply outlets need to be placed on each stationary wall and at the counters in each classroom. Floor outlets need to be placed in front of any movable walls.
- ☐ Electrical supply outlets need to be provided for any built-in audio-visual equipment installed in the classroom (e.g., television, VCR, electric ceiling screen, etc.) Controls for the screen should be by the light switches.
- ☐ Each classroom should have occupancy sensors installed for lights.

Lighting:

- ☐ Task lighting is needed in each stall and at each workbench.
- ☐ Ceiling drop lights should be provided to the center of each stall, and should be flourescent where possible.
- ☐ Lighting needs to be even across the classroom.

- ☐ Bi-level lighting will accommodate an instructor's need to vary the light intensity for different instructional tasks.
- ☐ The light fixtures need to be energy efficient T-8s with an electronic ballast to keep operating costs at a minimum. The lamps should have a CRI of .85.

Technology:

- ☐ Data drops should be installed in the following areas:

  Classroom area (4 - 6 drops)

  Combo room and information center

  Projection screen area

  Office

  Each stall (1-2 drops)
- ☐ Telephones are needed in the office, lab, classroom and combo room.
- ☐ Each classroom needs to have access to cable TV for commercial, satellite and closed circuit broadcasts over the cable.
- ☐ Telephone jacks should be placed near the door to the classroom and near the teacher's area.
- ☐ The telephone system should be programmed to enable outgoing calls directly from the classroom. All incoming calls should go through the main office switchboard.
- ☐ Each classroom should be equipped with an integrated clock, intercom, and bell system.
- ☐ Each classroom should be equipped with a TV, VCR, electric screen, an overhead and LCD projector.

- ☐ The area should be wired with data cable to enable the connection of a local area network and a wide area network.

SURFACES

Floors:

- ☐ Vinyl composition tile throughout classrooms, combo rooms, lockers and office is needed.
- ☐ Epoxy sealed concrete should be provided everywhere in the lab areas.
- ☐ Safety striping needs to be placed in zoned areas.
- ☐ Floors need to be light in color.
- ☐ Bollards should be installed in the floor around the overhead doors.
- ☐ A low slope should be considered for the lab floor.
- ☐ Consider a floor grate near the entry door if the outside area is not paved.
- ☐ Hazardous waste needs a floor containment area.

Walls:

- ☐ Bright colors are needed on all walls.
- ☐ Walls should be smooth cleanable surfaces, possibly block and metal.
- ☐ Windows and natural light should be considered, if possible.
- ☐ Windows need to be of double pane glass and have operable integral blinds where practical.
- ☐ Some tackable wall space is necessary in the classroom and lab.
- ☐ White boards with friction clips should be installed in the classroom and combo room.
- ☐ Tile or epoxy paint is needed in the wash area.

- ☐ Walls should be acoustically treated.
- ☐ The office must have internal windows for supervision of the lab and classroom areas.

Ceiling:

- ☐ Acoustical, dropped, ceiling tile is needed in the classroom, combo room and office.
- ☐ Ceiling beams should not be too low. Minimum clear height should be 15' - 20'.

Doors:

- ☐ Electric overhead doors are needed in the lab area. These doors should be 12' in width. A remote control door opener should be considered.
- ☐ Windows are needed in all entry doors.
- ☐ Double doors or an overhead door should be installed in the combo room.
- ☐ An oversized door or a Dutch door is needed in the tool room.
- ☐ A Dutch door is needed in the storage room or a roll up window with counter space.
- ☐ Insulated solid core doors are needed.
- ☐ Provide secured doors where applicable.

STORAGE

- ☐ In demonstration areas, metal counters with shelves underneath are necessary.
- ☐ Heavy duty storage is necessary for large rolling carts.

- ☐ Some pallet racks are necessary in the storage area.
- ☐ Lockers should be installed.
- ☐ Secured cabinets are needed in the storage room and tool room.
- ☐ Secured and covered outdoor component storage is needed.
- ☐ Secure automobile storage needs to be provided.
- ☐ Mock-up training aids storage should be provided.
- ☐ Storage for diagnostic tools and components need to be provided.
- ☐ Containment storage for hazardous waste is needed.
- ☐ Special storage for flammables is needed.
- ☐ Non-combustible storage is needed for grease rags.
- ☐ Each general classroom needs to have at least 24' of base cabinets for storage.
- ☐ The base cabinets should have counter tops with knee spaces underneath to act as desks for computer stations.
- ☐ Each general classroom needs to have overhead wall cabinets above the base cabinets.
- ☐ Each general classroom needs to have sufficient storage for those specialized books, magazines, and other instructional materials necessary for successful instruction.
- ☐ Each general classroom needs to have some secured storage cabinets for the personal effects of the instructors.
- ☐ Space is needed for two (2) four-drawer, letter-size file cabinets.
- ☐ Secured cabinets are needed in the office area.

FURNITURE AND EQUIPMENT

- ☐ Air compressor
- ☐ Hoist
- ☐ Overhead crane, if possible
- ☐ Wheel Balancer/Tire changer
- ☐ Diagnostic and Engine Analyzer
- ☐ Front end alignment
- ☐ Coolant Recycler
- ☐ Jack Stands
- ☐ Axle Stands
- ☐ Battery Charger
- ☐ Bearing packer
- ☐ Bench Grinder
- ☐ Engine Coolant Recovery Equipment
- ☐ Floor Jacks
- ☐ Hydraulic Press
- ☐ Oxy-Acetylene Torch
- ☐ Wheel Chocks
- ☐ 5" Vise
- ☐ Waste Oil Receptacle with Extension Neck and Funnel
- ☐ Recovery tanks for contaminated fuel storage or transfer.
- ☐ Sufficient desks, tables, and chairs to meet the needs of the instructional program.

- ☐ TV, VCR, overhead and LCD projector, and electric ceiling mounted screen.
- ☐ Consider rolling cabinet tool boxes for benches and storage.

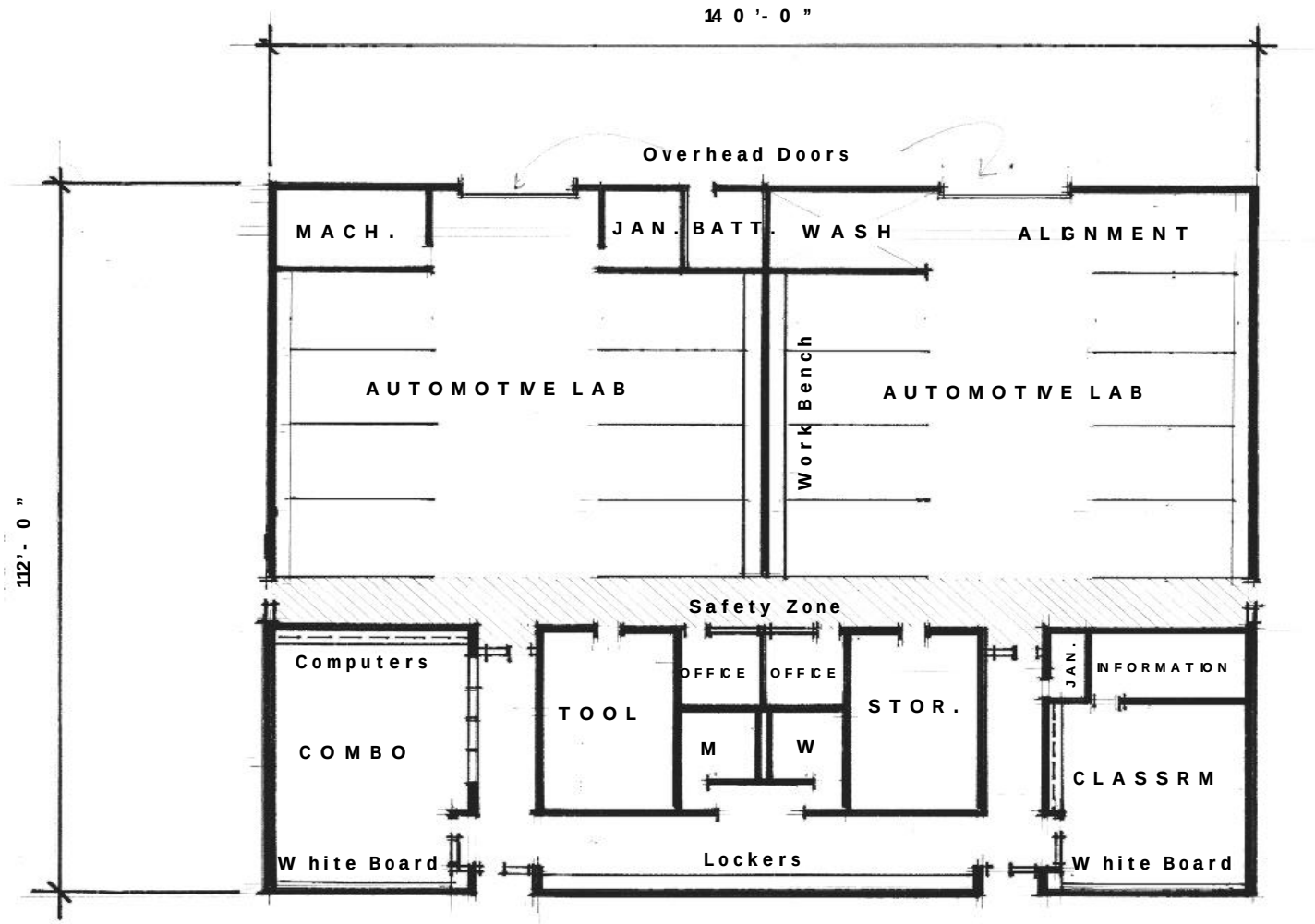
SAFETY

- ☐ CO monitors are needed
- ☐ Special storage for hazardous and combustible materials are needed.
- ☐ First aid kits should be included in the lab area.
- ☐ An infectious waste clean up station should be planned.
- ☐ All furniture should be ergonomically correct.

IMPORTANT NOTE

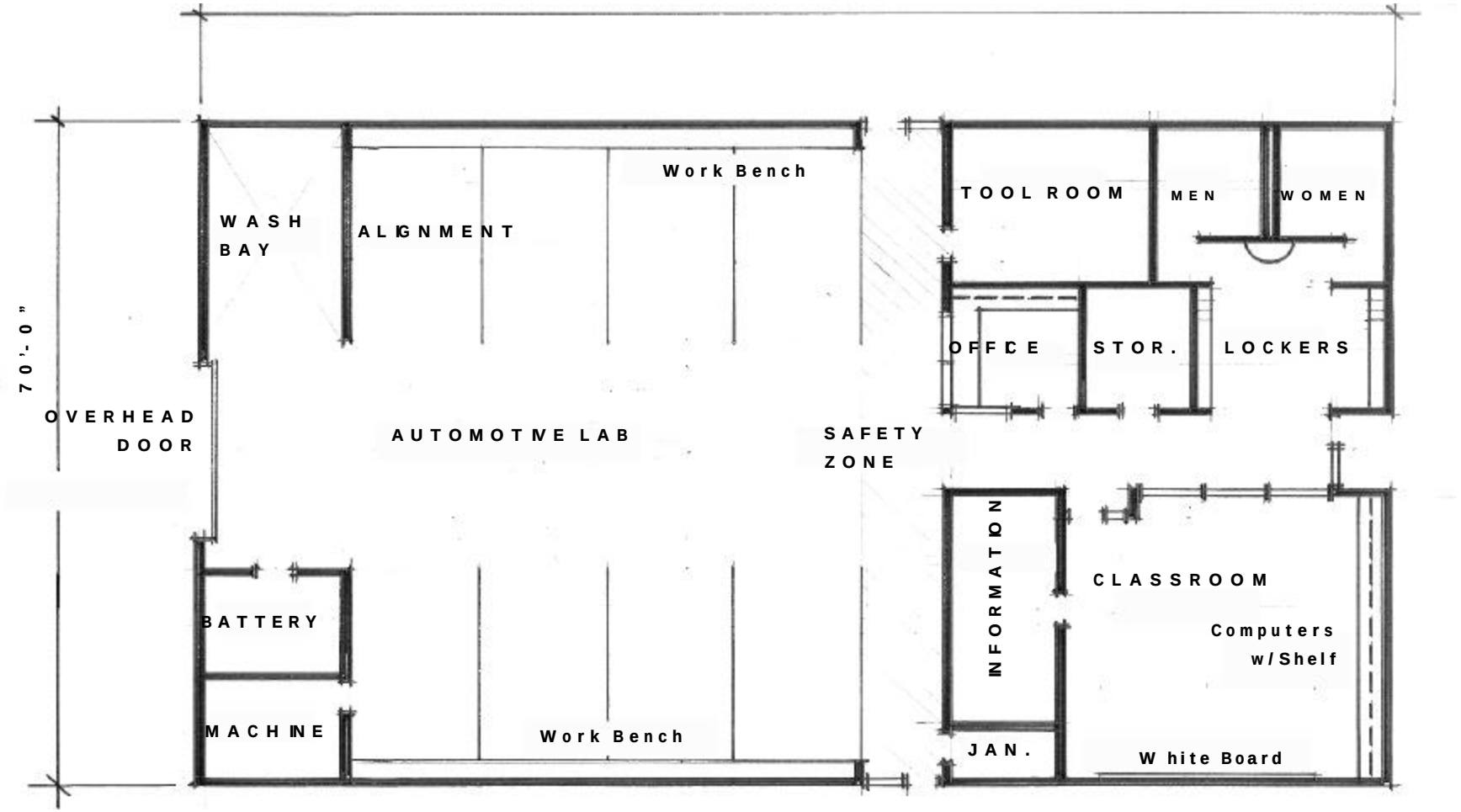
The following graphics are intended to show typical spaces and spacial relationships. They are not intended to serve as architectural drawings and are not adapted to specific sites.

These graphics should be used as a starting place for discussions with district personnel, planners, architects and engineers. Almost certainly, changes and adaptations will be required to meet the particular needs of the educational institution and the programs they offer.



AUTOMOTIVE/GENERAL MECHANICS (Large School)

The Matrix Group — Not to Scale



AUTOMOTIVE/GENERAL MECHANICS (Small School)

The Matrix Group **Not to Scale**